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'Catch it early, save a life and save a breast': this misleading mantra of mammography

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The one thing every layperson and politician knows with confidence with regard to breast cancer is that you've got to 'catch it early,' preferably before you can even feel it. It may come as a shock to some readers, but I disagree and there's such a thing as 'catching it too early'. Like Peter Gøtzsche in the current edition of the *JRSM*,[1] I think that that the global breast cancer screening programme has to be considered a 'failed experiment.' I also agree that the service as now provided should be closed down. I would go on to suggest that all the human and technological resources released by the closure of the National Health Service Breast Screening Service (NHSBSP), be redeployed into more fruitful areas for enhancing women's health. That aside we have much to learn from the fact that the experiment, set up in good faith, has indeed failed to live up to our expectations. The mantra, 'Catch it early, save a life and save a breast', turns out to be a false promise. Screening may have a borderline effect on reducing cause-specific mortality but does not save lives as judged by the outcome measure of all-cause mortality.[2] As far as saving breasts is concerned, the opposite is the truth. Populations of women attending for screening have a greater chance of a mastectomy than any control group.[2]

The hypothesis being tested in the experiment originated in the last half of the 20th century and was based on the assumption of the log linear kinetics of cancer development with distant dissemination being determined by the size (a poor surrogate for 'age') of the cancer. This was considered so self-evident as to have been translated into an ideological expression of faith. Yet, the experiment failed. The national breast screening programmes around the world have provided us with a natural experiment of the greatest historical importance, first, because it failed to deliver and, second, because of the recognition that mammography in asymptomatic women leads to the over-diagnosis of 'pseudo-cancers'.[3]

Cancer was defined by its microscopic appearance about 200 years ago. The 19th century saw the birth of scientific oncology with the discovery and use of the modern microscope. Rudolf Virchow, often called the founder of cellular pathology, provided the scientific basis for the modern pathologic study of cancer.[4] As earlier generations had correlated the autopsy findings observed with the unaided eye with the clinical course of cancer 100 years earlier,[5] so Virchow correlated the microscopic pathology of the disease. However, the material he was studying came from the autopsy of patients dying from cancer.

In the mid-19th century, pathological correlations were performed either on cadavers or on living subjects presenting with locally advanced or metastatic disease that almost always were pre-determined to die in the absence of effective therapy. Since then without pause for thought, the microscopic identification of cancer according to these classic criteria has been associated with the assumed prognosis of a fatal disease if left untreated. There is a syllogism at the heart of the diagnosis of cancer and therefore runs like this; *people frequently die from malignant disease, under the microscope this malignant disease has many histological features we will call 'cancer,' ergo anything that looks like 'cancer' under the microscope, will kill you.* I would therefore like to restate the argument, that some of these earliest stages of 'cancer' if left unperturbed, would not progress to a disease with lethal potential. These pathological entities might have microscopic similarity to true cancers, but these appearances alone are insufficient to predict a life-threatening disease. If we stand back and take a broader look at nature this shouldn't be surprising.

Conventional mathematical models of cancer growth are linear or logarithmic, in other words completely predictable at the outset; predicting transition from in-situ phases to early invasive and from early invasive to late invasive over time. Most natural biological mechanisms are non-linear or better described according to chaos theory. The beauty of the tree in full leaf and the symmetry of a sprig of broccoli, reflect their fractal geometry that looks remarkably similar to the appearance of the mammary ducts and lobules under the microscope.[6] The rate of growth

and the development of the lung along with the fingers and toes in the fetus cannot be described in linear terms. Prolonged latency followed by catastrophe should not be all that surprising.[7] We accept the case for prostate cancer, as we know that most elderly men will die with prostate cancer in situ and not of prostate cancer. In fact, the UK national PSA screening trial (ProtecT) is predicated on that fact with two *a priori* outcome measures defined, deaths from prostate cancer versus the number of cancers over-detected and treated unnecessarily.[8]

Further support for this contention comes from other sources. For example, there has been an epidemic of bilateral mastectomies in the USA following the uncontrolled proliferation of MRI scans in the routine work-up of women presenting with a single focus of early breast cancer.[9,10] The MRI scan is guilty of unveiling not only latent foci of pseudo-cancers outside the index quadrant but also latent foci harboured in the contra-lateral breast. This is heart-breaking when one considers all the work over three decades and all the patient volunteers in trials of breast conservation.[11,12] We now know with the utmost confidence that breast-conserving surgery is a safe alternative to more radical surgery, yet that hard won knowledge is brutally ignored when the surgeon is induced to treat the MRI image rather than the patient. Next, it is worth noting that contrary to all common sense predictions, the increased rate of detection of duct carcinoma in situ has led to an increase in the mastectomy rate for the screened population.[2,3] Up to 45% of screen detected cases of duct carcinoma in situ end up having mastectomy because of the multi-centricity of the disease.[13] Yet, the paradox is that clinically detected multi-centric invasive breast cancer is relatively uncommon.[14]

In conclusion, therefore, we can state, with a great deal of conviction, that a large proportion (in the order of 50%[3]) of screen detected (pre-clinical) foci of breast cancer is not programmed to progress if left unperturbed. This observation is of seismic importance and could set the agenda for breast cancer research for the next decade. If we choose to ignore these observations, because they fail to support our ideological belief system, then we will have missed an opportunity of a lifetime and that would be unforgivable.

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